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Research Paper

Assessment of Service Quality and Customers' Satisfaction in Addis Ababa City Light Rail Transit

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Abstract

The issue of urban mass transportation is becoming the center of cities' sustainable development and revitalization strategies. Hence, conducting a scientific inquiry into customers' satisfaction and service quality in urban light rail transport is vital to make policies and intervention measures instrumental and valid. The purpose of the study was to assess service quality and customer satisfaction in urban transport service delivery with particular reference to Addis Ababa City Light Rail Transit. To this end, the service performance (SERVPERF) model has been adapted and utilized as measurement constructs and a quantitative approach has been employed. The study was a descriptive and explanatory type involving the analysis of data collected through questionnaires from passengers of the Light Rail Transit. To analyze background information of respondents and their perception of service quality, descriptive statistics were applied. Besides, the study has utilized correlation and regression analysis. The finding of the study shows that the customers are moderately satisfied with assurance and responsiveness while they are dissatisfied with affordability, tangibility, reliability, and empathy. The correlation analysis of service quality dimensions (tangibility, reliability, responsiveness, assurance, empathy, and affordability) has shown, they all are positively correlated to overall service quality. Besides, all service quality dimensions have a significant effect on customer satisfaction implying that the higher the quality of service, the higher is the level of customers' satisfaction. In light of this, it is recommended that Addis Ababa light rail transit can improve customers' satisfaction by working on quality.

1. Introduction

The urban transport sector is an important component of the economy and a major component used for development. Economic opportunities have been increasingly related to the mobility of people, goods, and information. When transport systems are efficient, they provide economic and social opportunities and benefits that result in positive multiplier effects such as better accessibility to markets, employment, and additional investments (Rodrigue, 2017). As World Bank (2008) states, "*cities are the engines of economic growth in most developing countries, and that urban transport is the oil that prevents the engine from seizing up*". Transportation improvement can make cities much more efficient and productive.

According to Peter (2006), the earlier transport policies of the developed countries were oriented to automobile developments. However, because of environmental and financial issues, the concept of sustainable mobility became a trend and directed to new policies for mobility in cities. Due to increased travel demands, struggle for space and livability in the cities, growing carbon emissions from the transport sector, and

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the need to enhance mobility, a new transportation system called Light Rail System (LRS), was developed (Peter, 2006). The LRS is used in both developed and developing countries in the last decades. It is documented that in European countries, and also in many cities in Asia, Latin America, and Africa (like Algeria, Egypt, and Tunisia), LRS has been popular (African Development Bank, 2015).

Addis Ababa City is the diplomatic center of Africa and the seat for many international organizations. Addis Abba City is responsible for 60 percent of the country's industrial production and 50 percent of its GDP (Wondifiraw Zerihun et al., 2015; World Bank, 2015). Therefore, the role of transport in running the economic, social, and political activities of the city smoothly could not be easily valued.

Most trips in Addis Ababa are carried out using public transport and on foot. Sixty percent of the population are walkers (SABA Engineering P.L.C., 2005). The major modes of public transportation in Addis Ababa are buses, taxis, and light rail. Transportation service is being delivered to the public through public buses (*Anbesa* and *Sheger*), and other privately owned vehicles, such as *Higer* buses, small buses, taxis, and the Addis Ababa light rail transit service.

The limited number of buses and taxis in Addis Ababa has resulted in low quality, safety, and accessibility of the service delivery across the city (Kumar and Barrett, 2008). Users are hardly able to access public transport during peak hours or bad weather conditions (Tilahun Fenta, 2014). Sometimes the commuters are required to pay an extra fare or forced to disembark when only mid-way through their route (Mintesenot Gebeyehu and Takano, 2007; Kumar and Barrett, 2008). This has resulted in customer dissatisfaction in general.

On the other hand, the population of Addis Ababa is increasing significantly and the number of people who work in the city and reside out of the city has been increasing over time. As the population increases, the number of passengers using public transport also increases. To accommodate the increasing number of passengers, the transport service is expected to expand. However, the supply of transport services is not proportional to demand. Due to the limited number of mass transport options, city's dwellers who cannot afford other modes of transport are exposed to walk long distances on foot and longer line of waiting and travel time (SABA, 2005).

As one component of the Ethiopian growth and transformation plan (GTP I), the government launched Addis Ababa Light Rail Transit (AA-LRT) back in September 2015 to alleviate the transportation problem in the city. Despite all its contribution, based on casual observations and the available limited studies, (Haileyesus Alebachew, 2016; Habtamu Gebeyehu, 2017) during peak hours, the demand for light rail transport extremely exceeds the supply of service resulting longer waiting times and hard struggle to get the service. Moreover, trains are often overcrowded, which exposes passengers to accidents, suffocation, possible pickpocketing, and communicable diseases. This has made it difficult for the elderly, pregnant, patient, and persons with disabilities to use the LRS. However, most of the previous studies failed to measure the level of customers' satisfaction in urban light rail passenger service scientifically.

Therefore, whether customers are satisfied with the services provided by AA-LRT is a critical knowledge gap that needs to be addressed. Failure to conduct scientific customer satisfaction and quality survey, and use the finding as input for decision making may jeopardize the improvement of the service. Thus, this study was carried out to investigate service quality and customers' satisfaction in urban transport service delivery with particular emphasis on AA-LRT.

To this end, literature availed several models for measuring service quality. Service quality (SERVQUAL) and SERVPERF are among the models which researcher are using most often. Both models use five service quality dimensions and empirical studies (e.g. Parasuraman et al., 1988; Haileyesus, 2016; Habtamu, 2017) also show that service quality dimensions have relations with service quality. However, some studies have applied a certain pragmatic modification of the models. SERVPERF model is an improvised model of Parasurman's SERVQUAL. While SERVPERF dwells on perceived service quality, the SERVQUAL approach has got to elements-expectation and perception. Having reviewed both theories and empirical studies on service quality and customer satisfaction, the following conceptual framework (Figure 1), modified SERVPERF, has developed for this study.

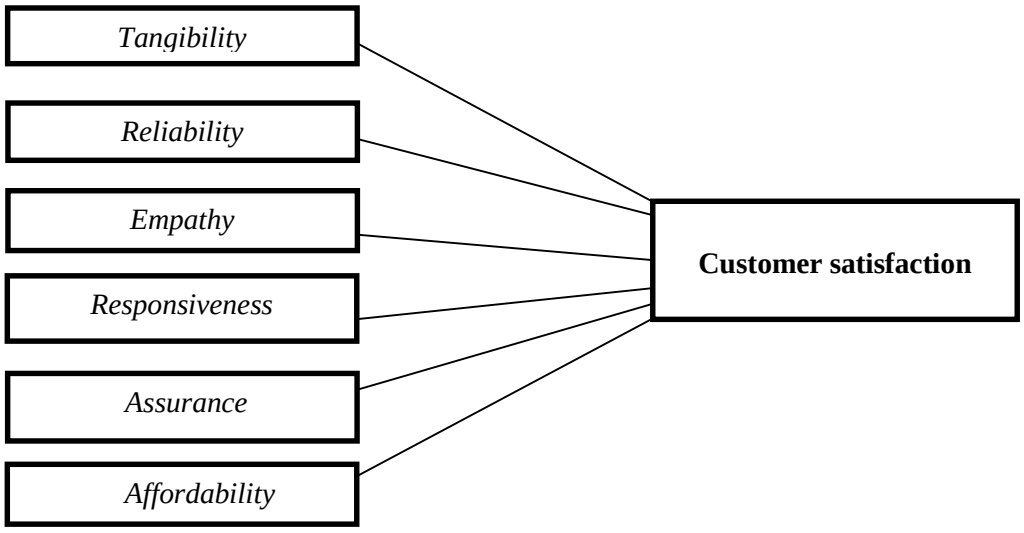

Figure 1: Conceptual Framework developed by the researchers based on reviewed literature

2. Materials and Methods

2.1. Research Design

This study aims to reach a generalization based on the quantitative measurement of patterns of behavior. Therefore a quantitative approach has been utilized. Besides, as the study mainly involves describing quantitative data and showcasing the casual relationship between variables, descriptive and explanatory research methods have been used. To achieve the research objectives, the researchers have conducted the survey using a structured questionnaire.

2.2. Sample and Sampling Procedure

AA-LRT has two lines i.e. East-West line from *Ayat* to *Torhailoch* and the South-North line from *Kality* to *Menelik II Square*. The two lines have a total number of 39 stations. From these stations, 22 stations stretched from North-South and the remaining 17 stations in the second line. Form a total of 39 stations, a total of 10 stations were selected based on researchers' judgment and proportional distance from the main terminals. Accordingly, 6 stations from the North-South (*Minilik II, Abenet, Mexico, Temenja Yazh, Nefas Silk I, and Kality*) and 4 stations from East-West (*Torhailoch, Hayahulet II, Management Institute, and Ayat*) were targeted in the study.

The study used Cochran's (1963) sample size determination formula for an unknown or large sample to come up with a sample size of 384. Once the sample size was determined the total sample was equally apportioned to the 10 stations resulting in 39 judgmentally selected passengers in each station. Though 384 respondents were distributed, 14 were found to be incomplete and void; hence the data analysis was carried out using 370 questionnaires.

To ensure representativeness, respondents who were found at the stations waiting for the service during peak, off, and weekend times were inculcated. Target respondents of this study were passengers that were within the age range between 15 and 65, living in Addis Ababa, and experienced in using light rail transport. The ages range 15 to 65 years old was chosen because people at this age have a routine commute travel behavior. From the age of 15, teenagers usually have to go to a school that is not in their neighborhood. After the age of 65, people usually do not have routine behavior because of pension.

2.3. Instruments

The data for this study were collected through a self-administered structured questionnaire. The first part of the questionnaire was the demographic profile of respondents, the second part incorporated the 25 items modified SERVPERF questions (Cronin and Taylor, 1992; Philop and Hazlette, 1997), and the third part included questions about overall service quality and overall customer satisfaction. All items were rated by respondents on a five-point Likert scale. The questionnaire was designed in Amharic, the working language of the country, in order to avoid language barrier. The questionnaires were distributed and

recollected by well-trained data collectors at the cite data collection.

The study has relied on the modified SERVPERF model developed in 1992. Service quality gurus (e.g Cronin and Taylor, 1992; Philop and Hazlette, 1997) confirmed that SERVPRF is suitable in scrutinizing customers' perceptions of service quality. Thus, through the utilization of a modified SERVPREF model, the study has conducted a descriptive survey using a structured questionnaire.

2.4. Reliability and Validity

Cronbach's alpha is used in this study to assess the internal consistency of the data collection instrument. Cronbach's alpha (coefficient alpha), ranges in value from 0, meaning no consistency, to 1, meaning complete consistency (all items yield corresponding values). The result of the overall scale reliability coefficient alpha for this study is r = 0.917 and the coefficient alpha for all six items of modified service quality found to be more than 0.702. The measures exceed the usual recommendation of alpha = 0.70 for establishing the internal consistency of the scale. To ensure validity, survey questions were reviewed by experts and it was proven that scales had an adequate content validity.

2.5. Data Analysis

Once the questionnaire was collected and returned, the researchers coded and entered data into Statistical Package for the Social Sciences version 23 (SPSS-23) software.

To find out the level of service quality and customers' satisfaction in AA-LRT, the appropriate descriptive statistics (means and standard deviations) were used to examine passengers' appraisal of the quality of service provided by the transit and their satisfaction with the services provided. To examine the relationship between perceived service quality and customers satisfaction in AA-LRT, the Pearson correlation was conducted to study the relationship between perceived service quality dimensions and overall customer satisfaction. To analyze the effect of service quality dimensions on customer satisfaction, a multiple regression analysis was carried out to examine the direction and strength of relationships among the constructs.

3. Results and Discussion

3.1. Level of Service Quality and Customers Satisfaction

Table 1 depicts respondents' perception towards modified service quality dimensions, overall service quality, and general customer satisfaction. The perception of respondents on assurance (M = 3.02) is better than other service quality dimensions and greater than moderate (M = 3.0). This is followed by responsiveness, affordability, and tangibility with an approximately moderate mean score of 3.0, 2.98, and 2.94 respectively. On the other hand, empathy and reliability are the least perceived values from the modified service quality dimensions with a mean score of 2.92 and 2.9, respectively.

Table 1: Descriptive Statistics

	N	Mean	Std. Dev.
Tangibility	370	2.9356	.51063
Reliability	370	2.9038	.49060
Responsiveness	370	3.0074	.53797
Assurance	370	3.0230	.56861
Empathy	370	2.9189	.56924
Affordability	370	2.9820	.51386
Overall service quality	370	2.92	.696
Customers satisfaction	370	2.90	.683

The mean perception of the customers on the assurance is relatively good (M = 3.02) which shows that as far as trustworthiness, courtesy, friendly approach, knowledge of the staff and installing a sense of safety among commuters during travel are concerned customers perceive that the service is slightly greater than moderate (M = 3). Similarly, the service quality perception of respondents on responsiveness (M = 3.0), affordability (M = 2.98), and tangibility (M = 2.94) are the second, third, and fourth better dimensions with a mean score of approximately moderate.

While responsiveness, as a SERVPRF dimension, is related to informing customer their rights and responsibilities and the willingness, ability, and promptness of employees in their response to customers' queries; affordability measures reasonableness of the fare given the service, availability of weekly, monthly or season based ticketing and comparative fairness of the

fair in comparison with other forms of transportation. Similarly, tangibility (M = 2.94) reflects the comfort of train station facilities, cleanliness of the inside environment of the train, professional appearance of the staff, accessibility of visual display materials, the comfort of seats, deployment of modern equipment.

However, customers' perception of the remaining SERVPRF dimension, empathy (M = 2.91), and reliability (M = 2.9) is the rate below moderate (average). This indicts that the quality of the service for customers with special needs and attention (disables, pregnant, children, and elderly) and accuracy of ticketing services, punctuality, safety/security of service, staff shows interest in solving problems and overall correctness of the service are found to be low.

Generally, the mean perception of respondents with overall service quality and customer satisfaction is below moderate (M = ~2.9). Assessing these mean scores in line with Anton's (1997) three zones of perception of service performance, AA-LRT customers' satisfaction index is slightly lower than moderate which is below the tolerance (acceptance) zone.

3.2 Correlation between SERVPRF Dimensions and Customer Satisfaction

Correlation analysis was used to check the strength of the relationship among various variables. In this study, the correlation of SERVPRF dimensions, overall service quality, and level of customers' satisfaction was analyzed. The value of the correlation coefficient could take values between -1 and 1 which means the coefficient is ranging from being negatively correlated (-1) to uncorrelated (0) and to positively correlated (1). The Pearson correlation result indicates the magnitude of relationships in the following categorization (Dancey and Reidy, 2004): the relationship is weak if the coefficient is between 0.10 and 0.3, moderate when it is between 0.40 and 0.6, and strong when it is between 0.70 and 1.00. When the correlation analysis coefficient is equal to 1, the Pearson result considers it as a perfect correlation.

As can be seen from Table 2 all service quality dimensions have a positive relationship with overall service quality and customer satisfaction through the magnitude of the relationship differ among service quality dimensions. There is a strong positive significant correlation between customer satisfaction and overall service quality (r = 0.895, p<0.001, df = n-1 = 369).

All of the dimensions, reliability (r = 0.824), assurance (r = 0.821), tangibility (r = 0.811), affordability (r = 0.779), and empathy (r = 0.702) have a high coefficient value showing the existence of a significant and strong relationship with overall service quality.

Table 2: Pearson Correlation among Measures

	Customers Satisfaction	Overall Service Quality	Tangibility	Responsiveness	Assurance	Reliability	Empathy	Affordability
Customers Satisfaction	1							
Overall Service Quality	0.895**	1						
Tangibility	0.877**	0.811**	1					
Responsiveness	0.808**	0.778**	0.763**	1				
Assurance	0.842**	0.821**	0.804**	0.803**	1			
Reliability	0.880**	0.824**	0.829**	0.821**	0.840**	1		
Empathy	0.745**	0.702**	0.713**	0.687**	0.729**	0.742**	1	
Affordability	0.844**	0.779**	0.809**	0.768**	0.803**	0.820**	0.711**	1

**. Correlation is significant at the 0.01 level (2-tailed).

On the other hand, all service quality dimensions have a positive relationship with the level of customer satisfaction albeit with varying degrees. In light of this, reliability (r = 0.88), tangibility (r = 0.87), affordability (r = 0.844), assurance (r = 0.842), responsiveness (r = 0.808), and empathy (r = 0.745) have a correlation coefficient values showing the existence of a significant and strong relationship with customer satisfaction (significant at 0.001 level (2-tailed)). The implication of the analysis result is that the better the quality of service with all the six modified quality dimensions, the higher the level of Addis Ababa light rail customer satisfaction.

Finally, the relationship between the overall service quality and customer satisfaction is also analyzed using correlation analysis. The result shows that overall service quality and customer satisfaction have both positive and significant relationships with a correlation coefficient value of 0.895. In effect this confirms that service quality and customer satisfaction are closely related (Parasuraman et al., 1988) explaining service quality is an antecedent of satisfaction (Cronin and Taylor, 1992).

Table 3: Results of Multiple Regressions between Tangibles, Reliability, Responsiveness, Assurance, Empathy, Affordability and Customer satisfaction

Coefficients[a]							
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Colinearity Statistics	
	B	Std. Error	β			Tolerance	VIF
(Constant)	-0.759	0.079		-9.646	0.000		
Tangibility	0.323	0.047	0.241	6.803	0.000	0.227	4.400
Reliability	0.272	0.056	0.195	4.862	0.000	0.177	5.649
Responsiveness	0.041	0.042	0.033	0.993	0.321	0.265	3.779
Assurance	0.030	0.045	0.025	0.667	0.505	0.205	4.869
Empathy	0.045	0.033	0.038	1.396	0.163	0.388	2.579
Affordability	0.180	0.045	0.136	3.970	0.000	0.244	4.093

[a] Dependent Variable: Customers satisfaction

Table 4: Result of ANOVA test

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	149.094	6	24.849	392.119	0.000[b]
	Residual	23.004	363	0.063		
	Total	172.097	369			

[a] Dependent Variable: Respondents' overall satisfaction

[b] Predictors: (Constant), Affordability, Empathy, Responsiveness, Tangibility, Assurance, Reliability

Table 5: Model Summary

Model	r	r^2	Adjusted r^2	Std. Error of the Estimate
1	0.931[a]	0.866	0.864	0.252

[a] Predictors: (Constant), Affordability, Empathy, Responsiveness, Tangibility, Assurance, Reliability

As Table 3 shows, the tolerance values of all independent variables are above 0.1 and the VIF values are below 10 which the two values together confirm none existence of a multicollinearity problem in the regression analysis under consideration. The subsequent ANOVA test and model summary tables also confirm the same. Moreover, tangibility, reliability, responsiveness, assurance, empathy, and affordability (the independent variables) impact the dependent variable (customers' satisfaction) are positive as values of coefficient β confirm. This means service quality dimensions contribute positively and significantly to customers' satisfaction. Tangibility, reliability, and affordability have a relatively higher effect with the value of β = 0.241, β = 0.195, and β = 0.136 on customers' satisfaction followed by empathy, responsiveness, and assurance with the value of β = 0.038, β = 0.033, and β = 0.025 respectively. This shows that while Tangibility, reliability, and affordability have a positive and significant effect on customers' satisfaction; empathy, responsiveness, and assurance have positive but insignificant impacts on customer satisfaction.

4. Conclusions and Recommendations

4.1. Conclusions

Urban light rail transport service delivery by AA-LRT has been scrutinized in this study. Modified service quality dimensions particularly the SERPREF was used as a construct to measure customer satisfaction of the same entity by applying various statistical tools. It merits wrap up the finding in the forthcoming statements so that their implication will be pinpointed clearly.

In the descriptive analysis portion of the paper, customers' perceptions were measured in terms of mean values. In line with this except for two quality dimensions, assurance, and responsiveness, where the satisfaction is slightly greater than moderate and moderate respectively, for the remaining quality dimensions customers are not satisfied with a mean score below moderate (5 points Likert mean of 3.0). Hence, customers of Addis Ababa Light rail transit are not satisfied with affordability, tangibility, reliability, and empathy dimensions. With regards to the overall service quality and customer satisfaction, the customers are not satisfied with Addis Ababa Light rail transit urban transport service delivery. However, as the mean scores are closer to moderate (5 points Likert mean of 2.9) with planned intervention it is possible to reach at least a moderate level of satisfaction.

The correlation analysis of service quality dimensions (tangibility, reliability, responsiveness, assurance, empathy, and affordability) shows, they all are positively significantly correlated to the quality of the overall service. The inference of this is that the better the quality of service with all the six modified quality dimensions, the higher the level of Addis Ababa light rail customer satisfaction. Besides, all service quality dimensions have a positive and significant relationship with the level of customer satisfaction. The strongest relationship is observed on reliability and tangibility. The overall service quality correlation with customer satisfaction is very strong and significant (r = 0.895). In conclusion, focusing on tangibility and responsiveness is necessary to fill the gap the correlation coefficient showed which would bring value addition to the customer service and ultimately secure a better level of customer satisfaction.

Regarding the effect analysis, it is found out that independent variables (service quality dimensions) have a significant impact on customers' satisfaction (dependent variables) but with varying degrees. From this, it is clear that Addis Ababa light rail transit can improve customers' satisfaction by working on quality.

4.2. Recommendations

In the service delivery process, Addis Ababa Light rail transit is not as empathetic as customers require. As clearly indicated in the quality dimension of empathy, Addis Ababa Light rail transit has to know the best interest of its customer and attempt to address it. Hence, the company has to revisit its manner of service delivery for customers with special needs and the friendliness of the service to all segments of the society (disabled, pregnant, children, and elderly). To this end, it is necessary to give attention to individual customer interests and requirements rather than apply, "one fits all" approach.

In the same token, the reliability of rail service delivery was found to be below moderate. This implies that the accuracy of ticketing services, punctuality, safety/security of service, staff interest in solving problems, and overall correctness of the service are

found below. Hence, organizations should strive to fulfill promises and pay attention to the results.

The service quality perception of respondents on responsiveness, affordability, and tangibility was rated approximately moderate. To improve the modest score of responsiveness the company should work on the willingness; ability and promptness of employees in their response to customers' queries and in effectively communicating customers' rights and responsibilities. Similarly to improve the moderate perceived quality score of affordability which measures reasonableness of the fare given the service, availability of weekly, monthly, or season-based ticketing the company has to commensurate service quality vis-a-vis the fare and design alternative ticketing package. Likewise, tangibility which reflects the comfort of train station facilities, cleanliness of the inside environment of the train, accessibility of visual display materials, comfort of seats, and deployment of modern equipment has scored approximately moderate perceived quality. To improve the tangibility score the company has to make timely maintenance of train facilities and visual display materials.

It is a well-established fact that satisfied customers are keys to higher economic returns and long-term business success (Kristensen et al., 1992 as cited in Munusamy et al., 2010). As this study confirms, in Addis Ababa Light rail context service quality is the biggest component that impacts customer satisfaction. The management of Addis Ababa Light rail transit has to give major attention to quality to bring about a better satisfaction level.

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